

REMARKS

This application has been carefully reviewed in light of the Office Action dated July 28, 2004. Claims 1, 2, 4 to 16 and 25 to 43 are pending in the application, of which Claims 1, 7, 12, 25, 27 to 30, 32 to 34 and 41 to 43 are independent.

Claims 1 to 13 are rejected under 35 U.S.C. § 103(a) over U.S. Publication No. 2002/0080391 (Sugiura) in view of U.S. Patent No. 6,354,689 (Couwenhoven) and U.S. Patent No. 6,565,174 (Kamoshida). Reconsideration and withdrawal of this rejection are respectfully requested.

The present invention concerns adjusting the printing of a printer that has a faulty print head created by malfunctioning ink nozzles. In prior systems, only the malfunctioning nozzles are turned off. This leads to the situation where there are two or more groups of nozzles that eject ink, leading to the necessity of a multi-path printing method to compensate for the defects in the print head. However, in the present invention, the largest grouping of functional nozzles are identified and all the nozzles not in that grouping are turned off, thus an image can be printed by a single-path printing method.

Turning to specific claim language, amended independent Claim 1 is directed to a print control apparatus which can be connected to a server that generates print data on the basis of printer information and information to be printed. The apparatus includes an acquisition unit for acquiring printer information which includes non-ejection nozzle information specifying a non-ejection nozzle of a print head from a printer connected to said apparatus; a transmission unit for transmitting information required to specify the information to be printed, and the printer information to the server; a reception unit for receiving print data from the server as a response; and a print control unit for controlling the printer to print the print data. The server delivers

(i) print data as data for nozzles in a maximum group of available nozzle groups that are formed by segmenting, by the non-ejection nozzle, nozzles of the print head to which the print data is to be ordinarily delivered, and (ii) NULL data as data for nozzles in the available nozzle groups other than the maximum group, and as data for the non-ejection nozzle, based upon the non-ejection information specifying the non-ejection nozzle acquired by the acquisition unit. The server gives a notice to the printer of reducing a feed amount by the number of nozzles to which NULL data is transmitted preparatory to delivery of the print data.

Applicant respectfully submits that the cited references, namely Sugiura, Couwenhoven and Kamoshida, considered either alone or in combination, fail to disclose or suggest all of the features of the print control apparatus of Claim 1. In particular, the cited references, either alone or in combination, fail to disclose or suggest at least the features of a print server that delivers (i) print data as data for nozzles in a maximum group in available nozzle groups that are formed by segmenting, by a non-ejection nozzle, nozzles of the print head to which the print data is to be ordinarily delivered, and (ii) NULL data as data for nozzles in the available nozzle groups other than the maximum group, and as data for the non-ejection nozzle, based upon the non-ejection information specifying the non-ejection nozzle acquired by the acquisition unit.

Sugiura discloses a print control method in which a terminal device transmits print data to a print server managing a printer so as to use the printer for printing. Furthermore, Kamoshida discloses that data is generated and paper feed is controlled so as to prevent a nozzle that is not used in a predetermined period. However, neither Sugiura nor Kamoshida disclose or suggest delivering (i) print data as data for nozzles in a maximum group of available nozzle groups that are formed by segmenting, by a non-ejection nozzle, nozzles of the print head to

which the print data is to be ordinarily delivered, and (ii) NULL data as data for nozzles in the available nozzle groups other than the maximum group, and as data for the non-ejection nozzle, based upon the non-ejection information specifying the non-ejection nozzle acquired by the acquisition unit.

Furthermore, Couwenhoven discloses an apparatus for compensating for a malfunctioning ink nozzle in a multi-tone ink jet print head. The apparatus employs a multi-path recording method to eliminate a blank line created by the malfunctioning nozzle. As shown in Figs 8 and 10, a malfunctioning nozzle is compensated for by another nozzle that records the same line that was to be recorded by the malfunctioning nozzle. According to the third embodiment, the malfunctioning nozzle is assigned to a zero state by properly selecting the set state. In addition, Couwenhoven discloses a "nozzle group" that consists of nozzles capable of printing along the same path. In other words, the nozzle group in Couwenhoven means nozzles that redundantly record a line by multi-path recording. In comparison to this, "nozzle groups" in the claimed invention are grouped by segmenting nozzles in the print head by a non-ejection nozzle. Therefore, the technical significance of the "nozzle group" in Couwenhoven differs from that in the present invention.

In addition, Couwenhoven discloses that a malfunctioning nozzle is assigned to a zero state. However, according to Couwenhoven, all nozzles except for a malfunctioning nozzle are still utilized to print an image, as shown in Figs 8 and 10. Only the malfunctioning nozzle is assigned to a zero state. Thus the print head is divided into two groups of functioning nozzles by malfunctioning nozzle 100. Therefore, when a zero state is transmitted to only the malfunctioning nozzle, both nozzle groups record an image part corresponding to the nozzles in the groups. This requires that a multi-path printing method be employed in Couwenhoven to

compensate for the malfunctioning nozzle. However, in the present invention, only the largest group of nozzles is used to carry on the printing. Thus, an image can be printed by using a single-path printing method.

In light of the deficiencies of Sugiura, Couwenhoven and Kamoshida as discussed above, Applicant submits that amended independent Claim 1 is now in condition for allowance and respectfully requests same.

Amended independent Claims 7 and 8 are directed to a method and a computer-executable program product embodied in a computer-readable medium, respectively, substantially in accordance with the apparatus of Claim 1. Accordingly, Applicant submits that Claims 7 and 8 are also now in condition for allowance and respectfully requests same.

The other pending claims in this application are each dependent from the independent claims discussed above and are therefore believed patentable for the same reasons. Because each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

CONCLUSION

No claim fees are believed due; however, should it be determined that additional claim fees are required, the Director is hereby authorized to charge such fees to Deposit Account 50-3939.

Applicant's undersigned attorney may be reached in our Costa Mesa, CA office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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